DOCUMENT RESUME

ED 140 276 CS 003 516

AUTHOR Leslie, Ronald C.
TITLE Task Demand Characteristics: Factors in Reading Comprehension.
PUB DATE [76]
NOTE 7p.; Report prepared at New York University

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Cognitive Processes; Elementary Secondary Education; Literature Reviews; *Psychological Studies; *Reading Comprehension; *Reading Research; *Research Problems; Task Analysis; Validity
IDENTIFIERS *Demand Characteristics

ABSTRACT

The use of cognitively oriented models in research in reading comprehension requires the examination of the task demand characteristics of the research. Those cognitive processes involved in the performance which are due to the experimental procedures must be separated from those which operate in normal circumstances. "Control programs"--which direct individuals' attempts to perform a task--are created either as a result of trial-and-error experience or on the basis of instruction. Instructions are one obvious source of different demand characteristics, but control programs are also affected by such factors as ambiguity as to the knowledge and procedures needed for a task or by the discovery that efficient control strategies have not been created. Such factors may lead individuals to change or modify their strategies for performing the task. Every task must have a response component, and, when this response is not one made under normal conditions, the cognitive processes necessary to make the response may affect performance. Because of these and other demand characteristics, the tasks employed in research in reading comprehension must be examined closely before the results are extrapolated to the classroom. (AA)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED140276

Task Demand Characteristics:

Factors in Reading Comprehension

PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY

Ronald C. Leslie

TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER

Ronald C. Leslie
Department of Educational Psychology
New York University

There has been a major change of emphasis in reading comprehension research over the past few years. This change parallels the growing importance of cognitive psychology (Reitman, 1965, Neisser, 1967) and its utility in educational research, particularly in the area of reading comprehension (Miller, 1975; Trabasso, 1975). The increased emphasis on the use of cognitive psychology and information processing models in reading research has been particularly evident in federal funding of educational research and development, and is now becoming established in traditional educational programs such as in reading, and educational psychology. I believe that our increased use of such cognitively-oriented models as tools in reading comprehension research requires that we examine the place of task demand characteristics in our research.

One of the goals of modern cognitive psychology is the identification and description of psychological structures and processes involved in performing activities such as reading the paper or selecting the correct bus with the use of a transit map. The logical outcome of this enterprise should be a new basis for understanding individual differences in terms of structures like semantic memory (Collins & Quillian, 1967; Collins & Loftus, 1975; Smith, Shoben & Rips, 1974) and processes such as those involved in the use of narrative structures in fairy tales (Rumelhart, 1975) or thematization in simple prose (Perfetti & Lesgold, 1976). Unlike a skills or behavioral objectives approach, the psychological constructs we develop are not uniquely defined by a single task.

CS 003 516

Rather, we make use of several experimental techniques to provide a set of converging operations to isolate and identify cognitive processes. This methodology is very similar to that adopted in the physical sciences after Einstein (Bridgman, 1927). It seems clear that the very techniques we use are based upon the fact that our experimental methods are themselves operating to affect performance. One of our primary tasks is to separate those cognitive processes involved in performance due to our experimental procedures from those which operate in real ecological circumstances.

The fact that human performance involves the integration of multiple cognitive processes (some of which may be due to the demand characteristics of our tasks) has rather direct implications for the interpretation of our findings. The validity of our interpretation of results is dependent upon a set of assumptions about the cognitive processes involved in the tasks. It is often assumed that our experimental methodologies do not introduce the need for cognitive processes which do not occur under normal conditions. Neisser (1976) has recently questioned this assumption with regard to the models of word recognition proposed by cognitive psychologists. He argues that models of word recognition which have been developed largely on the basis of data from tachistoscopic presentation of items are not ecologically valid. That is, they do not reflect the psychological processes involved in normal work recognition. The demand characteristics of tachistoscopic presentation differ in major ways from the task of reading a word in connected discourse. Specifically, those models involve the processes which operate in word recognition when the reader cannot fixate on the word more than once and when the strategies of identification are occurring without syntactic semantic, topical or narrative linguistic information. This is quite different word recognition from any which occurs outside the laboratory. I think that an awarenecss of the demand characteristics of the tasks used in generating these models will lessen the liklihood they are improperly used in education.

While I would like to believe that the differences between such word recognition models and reading are quire apparent and unlikely to be misinterpreted, I think there is reason to be wary. Historically, the failure to attend to the differences between the demand characteristics of research and reading was a major factor in the formulation of arguments for the whole word method of teaching reading. The results of Erdmann & Dodge (1898), Cattell (1885) and Pillsbury (1897) established that a word could be recognized at distances at which its individual letters could not be identified in isolation, that a word could be recognized at exposure durations equal to those needed for the identification of a single letter, and that word identification did not require the identification of each letter in the word. The whole word method of reading instruction was critically dependent upon these studies to establish a scientific rationale for its methodology. I would not like to see a similar situation occur in reading comprehension.

If we are to prevent such misinterpretations, we must be aware of some of the ways in which task demands may affect the nature of the underlying psychological processes in our research. A very general model of task performance might prove a helpful heuristic device. I assume that each individual has certain psychological structures which might affect performance: sensory store, short-term memory and long-term memory. Furthermore, I assume that long-term memory contains world knowledge and programs for accessing, storing, retrieving, integrating, evaluating and controlling the use of perceptual and memorial information for carrying out or attempting to carry out normal tasks. One of the most important types of programs which are needed in a task are those which direct our attempts to perform the task. I shall refer to these as control programs. These control programs have to be created-- either as a result of trial-and-error experience or on the basis of instruction. We might expect that instructions are a possible source of different demand

characteristics. However, instructions are not the only variables affecting these control programs. When there is ambiguity as to the knowledge and procedures needed for a task or the discovery that efficient control strategies have not been created, individuals may change or modify their strategies for performing the task. Information about the task itself may be one source of such change. Finally, every task must have a response component. When this response is not normally one made under normal conditions, the cognitive processes necessary to make the response may affect performance, thereby limiting the study. Let us consider these three sources of demand characteristics further.

Task instructions serve as a major influence on the subject's conception of how to approach the task. As recent research by Bjork and others has pointed out, the rehearsal strategies and encoding techniques used by subjects may be changed by instruction. Differences in the quantity and qualitative characteristics of what is remembered in a memory experiment have been shown to change with instructions. Subjective differences in interpretation of a set of instructions should have the possibility of similar effects. As Newell (1973) has stated,

> The interaction of the instructions with the task performance programs is as much central to control as the internal part of the performance program. It is predictable that a full fledged theory of task instructions will be required.

That is, if we are to understand the cognitive operations of a subject attempting some comprehension task, we will have to understand the role of instructions in the selection and integration of the processes used in the task.

Another factor in many experiments is the familiarity of the experimental task as the subject is presented with repeated trials. Task experience may lead to a change in performance. McConkie, Rayner & Wilson (1973) demonstrated that both reading speed and knowledge of specific types of subject matter may change as a function of experience with the task. This is of no small concern to the investigator who wants to know what the subject normally does in reading

connected discourse. Repeated measurement of the behavior may change the behavior being measured.

Finally, we have to recognize that we may incorporate task demands in such simple aspects of our studies as response formats. I have been working with Carol Cellman of Rutgers University, Newark in identifying possible sources of individual differences in reading comprehension in college students in an academic foundations program. Recently, Cellman noted that a number of non-native students whose original language was not written in Roman alphabet had difficulty in using a separate answer sheet for a comprehension exercise. It was a multiple choice format with the questions labeled with the lower-case letter a, b, c, and d. The students often wrote a b for a d and vice versa on their answer sheets. Non-comprehension related abilities were required in our task which we had assumed would pose no problem for the students. If the difficulty had not been discovered through questioning the students as to the reasons for their responses, we should have had a quite different interpretation as to the meaning of our data.

I think the importance of task demand characteristics for research in reading comprehension is clear. We cannot afford to neglect the role they have in our research. Therefore, I would like to make this request of both researchers, curriculum specialists and teachers. Before you make the extrapolation of research studies to the classroom, examine the kinds of tasks employed in the research, and look to see if the experimental tasks are closely related to the situations you are trying to understand. And if they aren't, be very cautious in your use of the research to guide any decision you might have to make.

[1] Paper presented at International Reading Association, Miami: May, 1977.

References

Bjork, R.A. Short-term storage: The ordered output of a central processor. In F. Restle, R.M. Shiffrin, N.J. Castellan, H.R. Lindman and D.B. Pisoni (Eds.) Cognitive theory, Vol. I. New York: Wiley, 1975.

Bridgman, P.W. The logic of modern physics. New York: Macmillan, 1927.

Cattell, J. McK. Ueber die zeit der Erkennung und Benennung von Schriftzeichen, Bildern und Farben. Reported in R.S. Woodworth, and H. Schlosberg. Experimental Psychology. New York: Holt, 1954.

Collins, A.M. and Loftus, E.F. A spreading activation theory of semantic processing. Psychological Review, 1975, 82, 407-428.

Collins, A.M. and Quillian, M.R. Retrieval time from semantic memory. Journal of Verbal Learning and Verbal Behavior, 1969, 8, 240-247.

Erdmann, B. and Dodge, R. Psychologische Untersuchungen uber das Lesen. Reported in R.A. Woodworth and H. Schlosberg, Experimental psychology. New York: Holt, 1954.

McConkie, G.W., Rayner, K. and Wilson, S.J. Experimental manipulation of reading strategies. Journal of Educational Psychology, 1973, 65, 1-8.

Miller, G.A. (Ed.) Semantics, concepts and culture. Panel Report. National Institute of Education Conference on studies in reading. Washington: N.I.E., 1975.

Neisser, N. Cognitive psychology. New York: Appleton-Century-Crofts, 1967.

Neisser, U. Cognition and reality: Principles and implications of cognitive psychology. San Francisco: Freeman, 1976.

Newell, A. Production systems of control processes, In W.G. Chase (Ed.), Visual information processing. New York: Academic Press, 1973.

Perfetti, C.A. and Lesgold, A.M. Discourse comprehension and individual differences. Paper presented at the Twelfth Annual Carnegie Symposium on Cognition, Carnegie-Mellon University, Pittsburgh, May 1976.

Pillsbury, W.B. A study in apperception. American Journal of Psychology, 1897, 8, 315-393.

Reitman, W.R. Cognition and thought: An information-processing approach. New York; Wiley, 1965.

Rumelhart, D.E. Notes on a schema for stories. In D.G. Bobrow and A Collins (Eds.), Representation and understanding: Studies in cognitive science. New York: Academic Press, 1975.

Smith, E.E., Shoben, E.J. and Rips, L.J. Structure and process in semantic memory: A featural model for semantic decisions. Psychological Revue, 1974, 81, 214-241.

Trabasso, T. (Ed.) The structure and use of language. Panel 2 Report, National Institute of Education Conference on studies in reading. Washington: N.I.E., 1975.